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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/681,615 | 10/08/2003 | Masashi Goto | 2204-10-3 | 7280 |

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GRAYBEAL, JACKSON, HALEY LLP
155 - 108TH AVENUE NE
SUITE 350
BELLEVUE, WA 98004-5901

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| EXAMINER |
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MCDONALD, RODNEY GLENN

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| ART UNIT | PAPER NUMBER |
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1753

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/681,615

Applicant(s)

GOTO ET AL.

Examiner

Rodney G. McDonald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

PROSECUTION ON THE MERITS REOPENED:

Prosecution on the merits of this application is reopened based on the newly discovered reference(s) to Kuehnle (U.S. Pat. 4,294,678). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi (Japan 2001-203099) in view of Akimoto (U.S. Pat. 6,189,481) and Kuehnle (U.S. Pat. 4,294,678).

Regarding claim 1, Noguchi teaches a plasma processing chamber 30 as seen in Fig. 3. (See Fig. 3) In Fig. 3 is shown a chamber 30 defining at least one opening (not labeled) and constructed for retaining a generated plasma. A dielectric member 31 positioned to sealingly cover the at least one opening and having for forming a generally rectangular shape. At least one waveguide 12 having a generally rectangular cross section (See Figures 3, 4(a)-(c)) to oppose the dielectric member 31. The rectangular wave guide defines a homogenous volume. A microwave oscillator (not shown) provides microwaves in the direction of arrow in Fig. 3. At least one hole 13 having a generally rectangular cross section and formed in the at least one waveguide 12 and positioned to oppose the dielectric member. One side of the at least one hole is parallel to one side of the dielectric member 31. (See Abstract; See Machine translation 0019-0024; Machine translation 0032-0037; Figure 3, 4(a)-4(c))

The differences between Noguchi and the present claims are adjusting the holes size to adjust the opening area of the holes (Claim 1), the shutters being located "in at least one of the plurality of holes" is not discussed (Claim 1), having larger hole areas than other areas is not discussed (Claim 2), a hole having the largest hole area located on the terminal end side of the wave guide is not discussed (Claim 3), one of the holes being located near the periphery of the dielectric member is not discussed (Claim 5), wherein one of the holes has long sides which are parallel to one side of the dielectric member (Claim 6), the hole area of the hole on the side wall surface of the chamber being made the largest with the hole area adjusting means is not discussed (Claim 7),

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where the hole area adjusting means is made with a metal-plate like portion by reciprocating the plate-like portion is not discussed. (Claim 8)

Regarding the adjusting of the holes size to adjust the opening area of the holes (Claim 1), Akimoto '481 teach providing shutters for slots, which radiate electromagnetic waves. The slots can be opened or closed selectively by respective shutters 62. Operating members 64 are respectively connected to the shutters 62. In this configuration shutters 62, i.e., the areas of the radiation ports can be controlled at the outside of the chamber independently of each other. For example, assume that a wafer or similar semiconductor substrate 18 should have the central part thereof treated to a greater degree than the peripheral part. Then, the radiation ports 32 facing the central part of the substrate 18 will be opened wider than the other radiation ports 32 facing the peripheral part. (Column 3 lines 45-48)

Regarding the shutters being located "in at least one of the plurality of holes" (Claim 1), Kuehnle teach providing a shutter in a hole of a wall. (See Fig. 2; Column 2 lines 61-68; Column 3 lines 1-2)

The motivation for locating the shutter in the hole is that it allows for sealing the hole from the chamber. (Column 1 lines 43-46)

Regarding having larger hole areas than other areas (Claim 2), Akimoto '481 teach that the holes can be selectively controlled such that there are larger areas for example in the center and smaller hole areas at the periphery. (Column 3 lines 45-48)

Regarding a hole having the largest hole area located on the terminal end side of the wave guide (Claim 3), since Akimoto '481 teach that the holes can be selectively

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controlled in area it is believed that the apparatus can have a hole with the largest area on the terminal end side of the wave guide. (Column 3 lines 45-48)

Regarding where one of the holes is located near the periphery of the dielectric member (Claim 5), Akimoto '481 teach locating holes near the periphery of the dielectric member. (See Fig. 3B; Figure 4; Column 3 lines 45-48)

Regarding wherein one of the holes has long sides which are parallel to one side of the dielectric member (Claim 6), Akimoto et al. teach in Fig. 3B having holes with long sides which can be parallel to one side of the dielectric member. (See Fig. 3B)

Regarding the hole area of the hole on the side wall surface of the chamber being made the largest with the hole area adjusting means (Claim 7), since Akimoto et al. recognize that the central holes can be made large than the peripheral holes it follows that the apparatus could operate such that the central holes are made smaller than the peripheral holes thus leading to holes on the side wall surface of the chamber being largest. (Column 3 lines 45-53)

Regarding where the hole area adjusting means is made with a metal-plate like portion by reciprocating the plate-like portion (Claim 8), Akimoto et al. teach the hole area adjusting means being plate-like (i.e. shutter) and can be selectively moved (i.e. reciprocated). From Fig. 3A the shutters appear to be metal. (See Akimoto et al. Column 3 lines 45-58; Fig. 3A)

The motivation for controlling the holes size of the microwave radiation holes with a selective member is that it allows for control of plasma distribution. (See abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Noguchi et al. by utilizing hole area means to control the area of the electromagnetic radiating holes as taught by Akimoto '481 and to have located the shutters in the holes as taught by Kuehnle because it allows for control of plasma distribution and for sealing the holes off from the chamber.

Claim 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi in view of Akimoto '481 and Kuehnle as applied to claims 1-3 and 5-8 above, and further in view of Matsumoto et al. (U.S. Pat. 6,290,807).

The difference not yet discussed is the use of plural waveguides.

Matsumoto et al. teach utilizing plural waveguides for introducing microwaves.
(Column 11 lines 31-52)

The motivation for utilizing plural waveguides is that it will prevent a decrease in the energy in different areas of the chamber. (Column 11 lines 47-52)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized plural waveguides as taught by Matsumoto et al. because it allows for preventing a decrease in energy in different areas of the chamber.

Response to Arguments

Applicant's arguments filed August 23, 2006 have been fully considered but they are not persuasive.

In response to the argument that Akimoto '481 does not teach locating the shutters in the holes, it is argued that newly cited reference to Kuehnle teach locating

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shutters in holes in order to close the holes off from the chamber. Akimoto '481 recognize that the shutters can be variable in order to control the amount of opening of the holes for controlling plasma density. (See Akimoto '481 and Kuehnle discussed above)

This action will be made NON-Final based on the newly cited reference.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
September 7, 2006